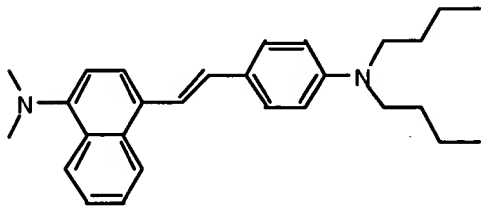
Listing of Claims:

1-2. (Cancelled)

3. (Previously presented) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is selected from the group consisting of



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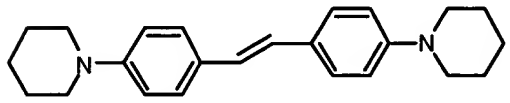

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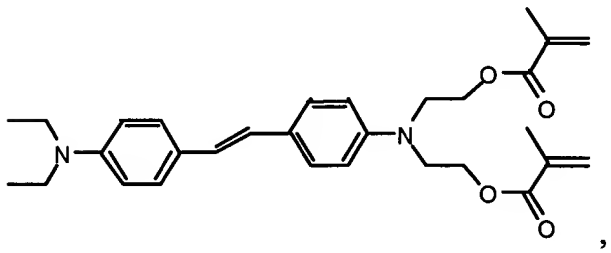

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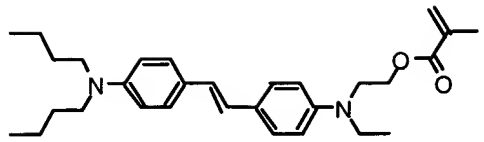

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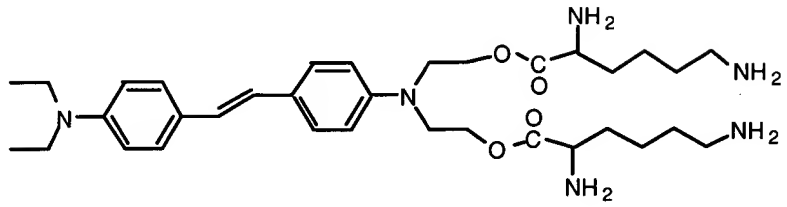

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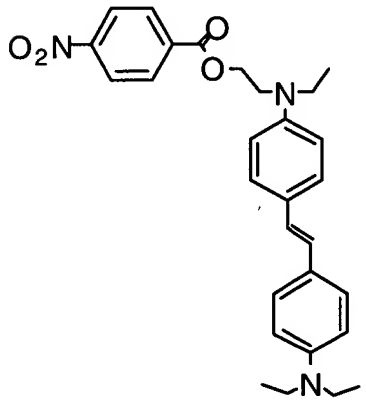

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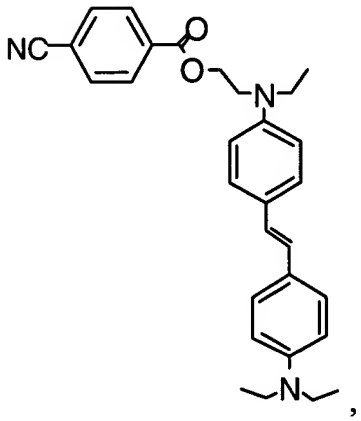

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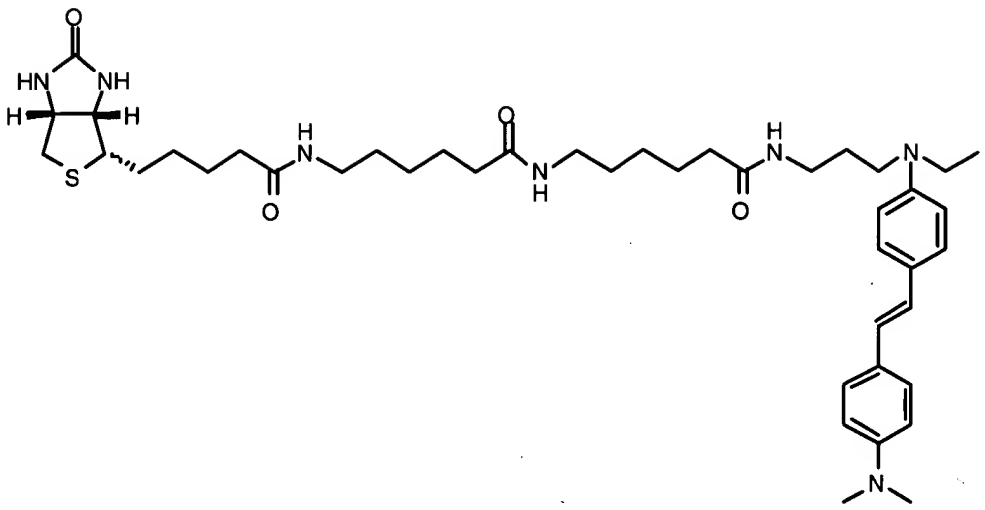

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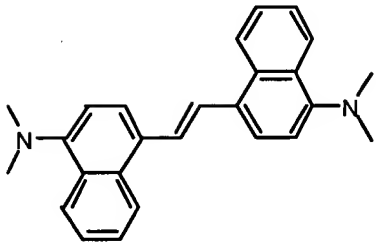

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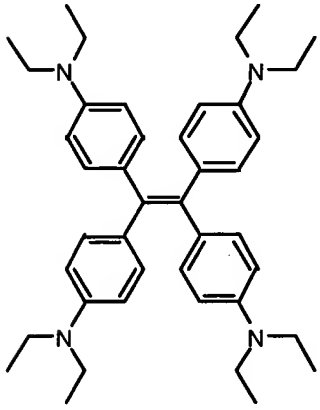

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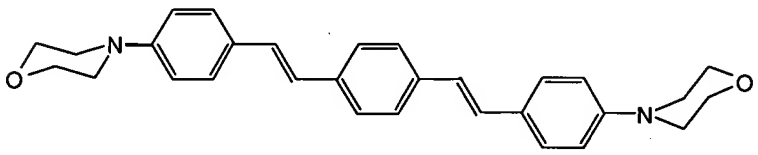

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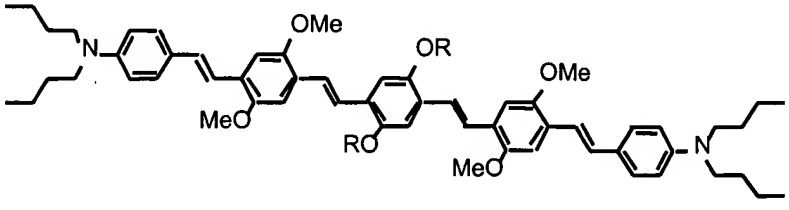

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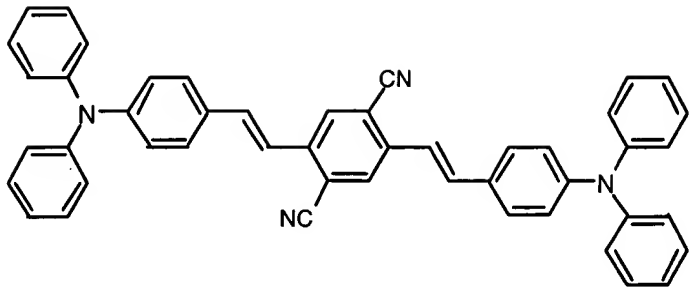
CN
N
NC
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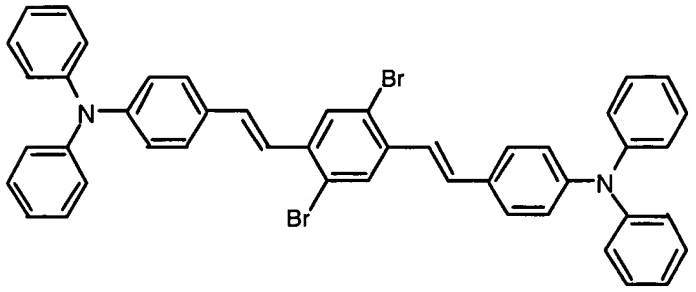
,


Br
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Br
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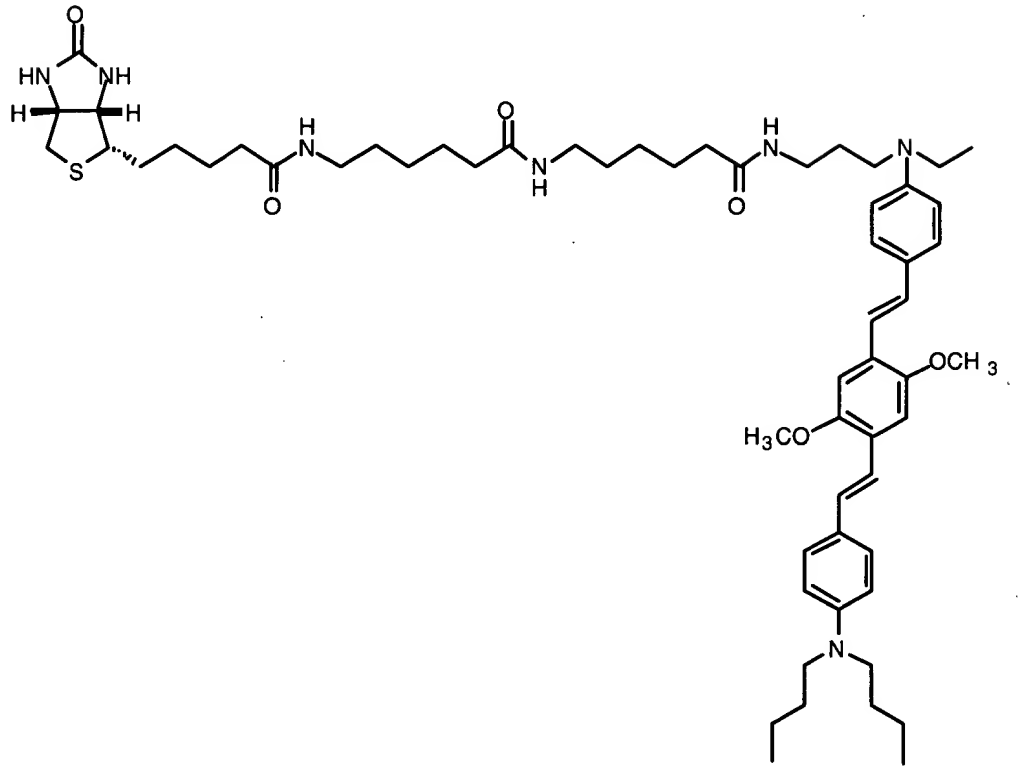
O
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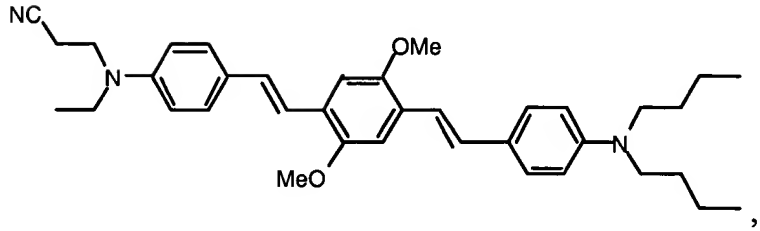
NC
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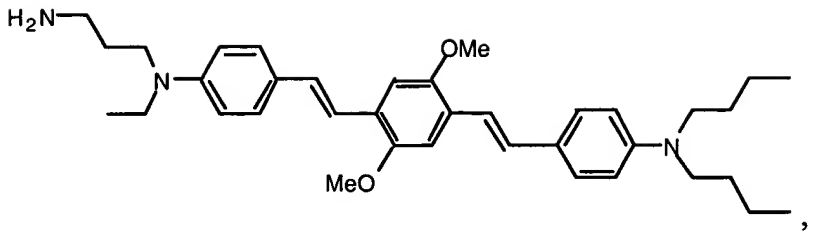
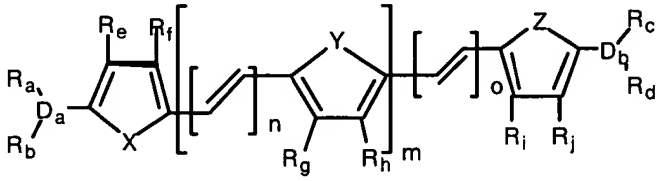


and mixtures thereof, where $R=(CH_2)_{11}CH_3$.

4. (Currently Amended) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



where D_a is selected from the group consisting of N, O, S ~~and~~, P and not present;

where D_b is selected from the group consisting of N, O, S ~~and~~, P and not present;

m, n, o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, $0 \leq o \leq 10$, and $m + n + o \geq 1$; and

where:

X, Y, Z are independently selected from the group consisting of: $CR_k=CR_l$; O; S; and N-R_m;

R_a, R_b, R_c, R_d are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{a1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{a2}R_{a3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{a2}R_{a3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl; where $0 < \alpha < 10$ and $1 < \beta < 25$, a group of aromatic rings having up to 20 carbons in the aromatic ring framework; fused aromatic rings, vinyl; allyl; 4-styryl; acroyl; methacroyl; acrylonitrile, isocyanate; isothiocyanate; epoxides; strained ring olefins; $(-CH_2)_\delta SiCl_3$; $(-CH_2)_\delta Si(OCH_2CH_3)_3$; and $(-CH_2)_\delta Si(OCH_3)_3$; where $\delta < 25$;

wherein one of Ra and Rb is not present when Da is O, S or not present, and wherein one of Rc and Rd is not present when Da is O, S or not present;

R_{a1}, R_{a2}, and R_{a3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons, a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof, and methacryloyl chloride;

R_e, R_f, R_g, R_h, R_i, R_j, R_k, R_l and R_m are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{b1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{b2}R_{b3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{b2}R_{b3}$, where R_{b1}, R_{b2}, and R_{b3} are independently selected from the group consisting of a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof and methacryloyl chloride; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, where $0 < \alpha < 10$ and $1 < \beta < 25$; a group of aromatic rings having up to 20 carbons in the aromatic framework; fused aromatic rings; CHO; CN; NO_2; Br; Cl; I; phenyl; an acceptor group containing more than two carbon atoms; a functional group derived from an amino acid and $NR_{e1}R_{e2}$; OR_{e3}; where R_{e1}, R_{e2}, R_{e3} are defined as for R_n and R_o, where R_n and R_o are defined as any member of the group consisting of H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$;

$-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl; aryl groups; fused aromatic rings; and polymerizable functionalities; and

~~R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof and methacryloyl chloride~~

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5. (Currently Amended) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

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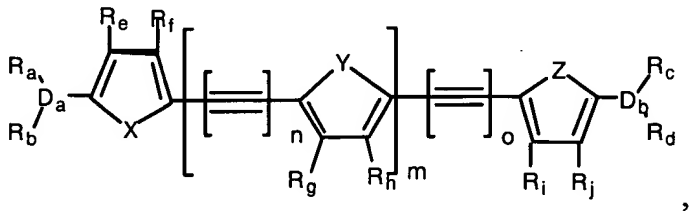

where D_a is selected from the group consisting of N, O, S, P and not present ~~and P~~;

where D_b is selected from the group consisting of N, O, S, P and not present ~~and P~~;

m, n, o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, $0 \leq o \leq 10$, and $m + n + o \geq 1$; and

where:

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R_e, R_f, R_g, R_h, R_i, R_j, R_k, R_l and R_m are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{b1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{b2}R_{b3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{b2}R_{b3}$, where R_{b1}, R_{b2}, and R_{b3} are independently selected from a functional group derived from an amino acid, a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof and methacryloyl chloride; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, where $0 < \alpha < 10$ and $1 < \beta < 25$; a group of aromatic rings having up to 20 carbons in the aromatic framework; fused aromatic rings; CHO; CN; NO_2; Br; Cl; I; phenyl; an acceptor group

containing more than two carbon atoms; a functional group derived from an amino acid and $NR_{e1}R_{e2}$; OR_{e3}; where R_{e1}, R_{e2}, R_{e3} are defined as for R_n and R_o, where R_n and R_o are defined as any member of the group consisting of H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl; aryl groups; fused aromatic rings; and polymerizable functionalities; and

~~R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; a functional group derived from an amino acid: a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof and methacryloyl chloride~~

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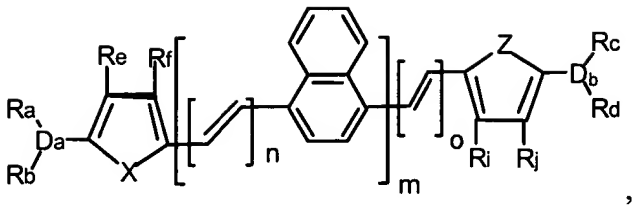
6. (Currently Amended) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



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where D_a is selected from the group consisting of N, O, S, P and not present ~~and P~~;

where D_b is selected from the group consisting of N, O, S, P and not present ~~and P~~;

m, n, o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, $0 \leq o \leq 10$, and $m + n + o \geq 1$; and

where:

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derivatives thereof, methacryloyl chloride; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$CN; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$Cl; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$Br; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$I; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$-Phenyl, where $0 < \alpha < 10$ and $1 < \beta < 25$; a group of aromatic rings having up to 20 carbons in the aromatic framework; fused aromatic rings; CHO; CN; NO_2; Br; Cl; I; phenyl; an acceptor group containing more than two carbon atoms; a functional group derived from an amino acid and $NR_{e1}R_{e2}$; OR_{e3}; where R_{e1}, R_{e2}, R_{e3} are defined as for R_n and R_o, where R_n and R_o are defined as any member of the group consisting of H; a linear or branched alkyl group with up to 25 carbons; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta OR_{g1}$; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta NR_{g2}R_{g3}$; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta CONR_{g2}R_{g3}$; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$CN; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$Cl; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$Br; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$I; -$(CH_2CH_2O)_\alpha$-$(CH_2)_\beta$-Phenyl; aryl groups; fused aromatic rings; and polymerizable functionalities; and

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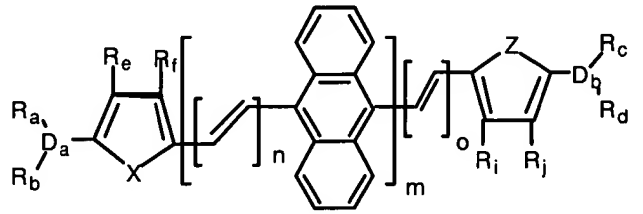
7. (Currently Amended) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and

the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



,

where D_a is selected from the group consisting of N, O, S, P and not present ~~and P~~;

where D_b is selected from the group consisting of N, O, S, P and not present ~~and P~~;

m, n, o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, $0 \leq o \leq 10$, and $m + n + o \geq 1$; and

where:

X, ~~Y,~~ and Z are independently selected from the group consisting of: $CR_k=CR_l$; O; S; and N-R_m;

R_a, R_b, R_c, R_d are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{a1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{a2}R_{a3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{a2}R_{a3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl; where $0 < \alpha < 10$ and $1 < \beta < 25$, a group of aromatic rings having up to 20 carbons in the aromatic ring framework; fused aromatic rings, vinyl; allyl; 4-styryl; acroyl; methacroyl; acrylonitrile, isocyanate; isothiocyanate; epoxides; strained ring olefins; $(-CH_2)_\delta SiCl_3$; $(-CH_2)_\delta Si(OCH_2CH_3)_3$; and $(-CH_2)_\delta Si(OCH_3)_3$; where $\delta < 25$;

wherein one of Ra and Rb is not present when Da is O, S or not present, and wherein one of Rc and Rd is not present when Da is O, S or not present;

R_{a1}, R_{a2}, and R_{a3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons, a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof, and methacryloyl chloride;

R_e, R_f, R_i, R_j, R_k, R_l and R_m are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{b1}$;

$-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{b2}R_{b3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{b2}R_{b3}$, where R_{b1}, R_{b2}, and R_{b3} are independently selected from the group consisting of a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof, methacryloyl chloride; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, where $0 < \alpha < 10$ and $1 < \beta < 25$; a group of aromatic rings having up to 20 carbons in the aromatic framework; fused aromatic rings; CHO; CN; NO_2; Br; Cl; I; phenyl; an acceptor group containing more than two carbon atoms; a functional group derived from an amino acid and $NR_{e1}R_{e2}$; OR_{e3}; where R_{e1}, R_{e2}, R_{e3} are defined as for R_n and R_o, where R_n and R_o are defined as any member of the group consisting of H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl; aryl groups; fused aromatic ring; and polymerizable functionalities; and

~~R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof and methacryloyl chloride~~

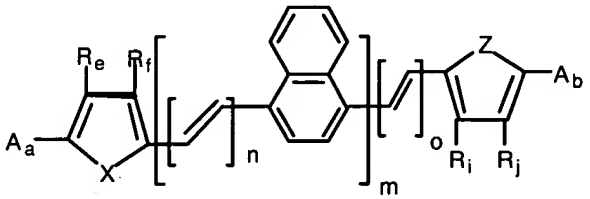
R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; a functional group derived from an amino acid; or a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene; ruthenocene; cyanuric chloride and derivatives thereof; and methacryloyl chloride.

8-12. (Cancelled)

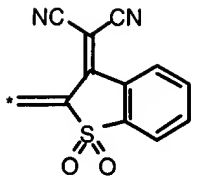
13. (Currently Amended) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



where A_a and A_b are independently selected from the group consisting of: CHO; CN; NO_2; Br; Cl; and I; and



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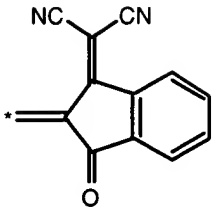

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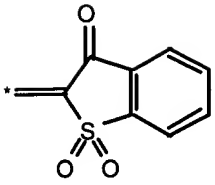

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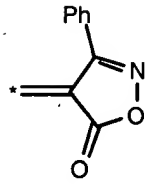

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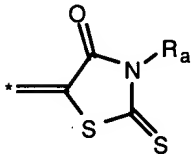

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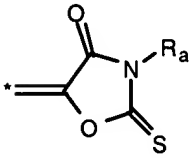

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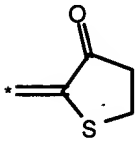

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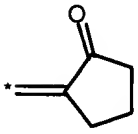

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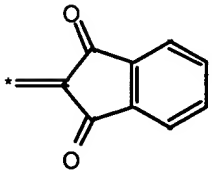

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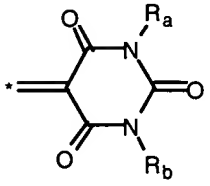

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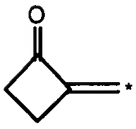

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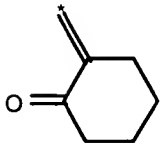

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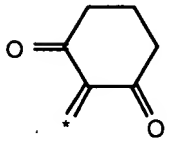

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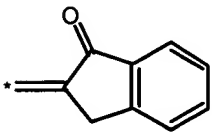

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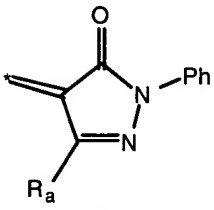

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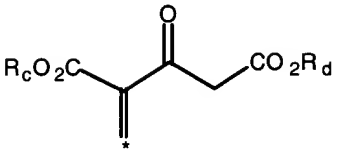

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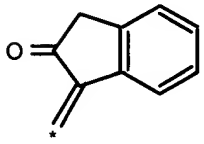

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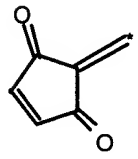

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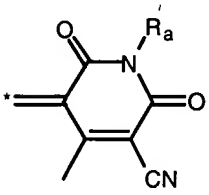

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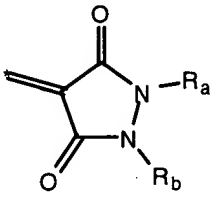

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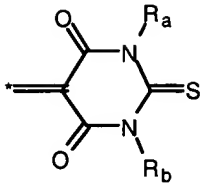

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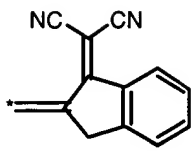

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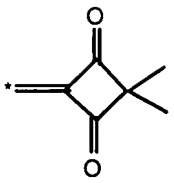

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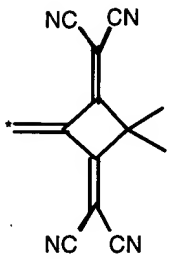

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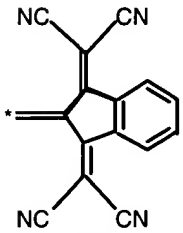

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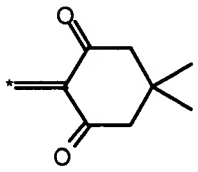

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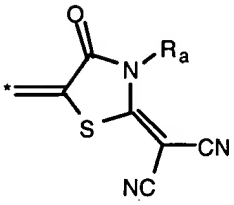

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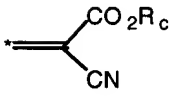

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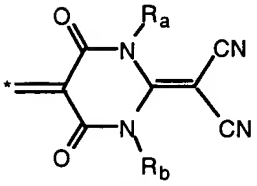

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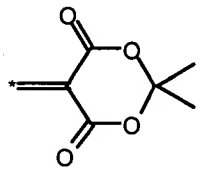

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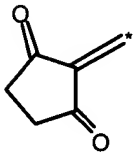

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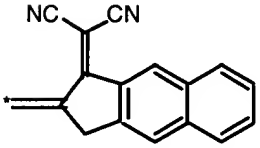

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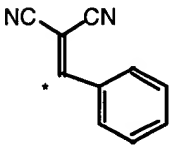

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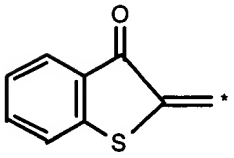

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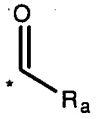

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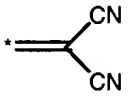

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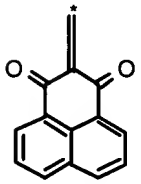

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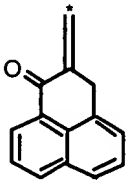

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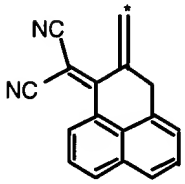

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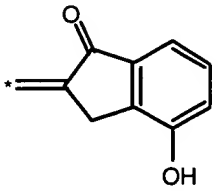

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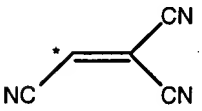

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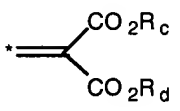


A42

~~in addition A_a and A_b are independently selected from the group consisting of: Br, Cl, and I;~~

where * indicates the point of attachment of A1-A42 to the atom to which it is to be attached;

-and where $0 \leq m \leq 10$, $0 \leq n \leq 10$, $0 \leq o \leq 10$, and $m + n + o \geq 1$; and where:

~~X, Y,~~ and Z are independently selected from the group consisting of: $CR_k=CR_l$; O; S; and N-R_m;

R_a, R_b, R_c, R_d are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{a1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{a2}R_{a3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{a2}R_{a3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl; where $0 < \alpha < 10$ and $1 < \beta < 25$, a group of aromatic rings having up to 20 carbons in the aromatic ring framework; fused aromatic rings, vinyl; allyl; 4-styryl; acroyl; methacroyl; acrylonitrile, isocyanate; isothiocyanate; epoxides; strained ring olefins; $(-CH_2)_\delta SiCl_3$; $(-CH_2)_\delta Si(OCH_2CH_3)_3$; and $(-CH_2)_\delta Si(OCH_3)_3$; where $\delta < 25$;

R_{a1}, R_{a2}, and R_{a3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons, a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof, and methacryloyl chloride;

R_e, R_f, R_i, R_j, R_k, R_l and R_m are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{b1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{b2}R_{b3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{b2}R_{b3}$, where R_{b1}, R_{b2}, and R_{b3} are independently selected from the group consisting of a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof; methacryloyl chloride; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, where $0 < \alpha < 10$ and $1 < \beta < 25$; a group of aromatic rings having up to 20 carbons in the aromatic framework; fused aromatic rings; CHO; CN; NO_2; Br; Cl; I; phenyl; an acceptor group containing more than two carbon atoms; a functional group derived from an amino acid and $NR_{e1}R_{e2}$; OR_{e3}; where R_{e1}, R_{e2}, R_{e3} are defined as for R_n and R_o, where R_n and R_o are defined as any member of the group

consisting of H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl; aryl groups; fused aromatic rings; and polymerizable functionalities; and

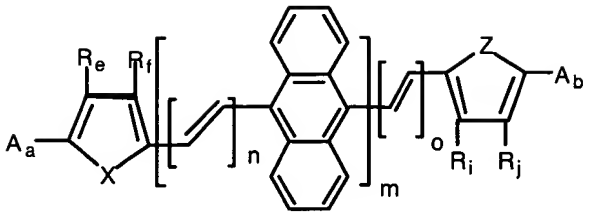
~~R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; a functional group derived from an amino acid or a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof and methacryloyl chloride~~

R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; a functional group derived from an amino acid; or a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene; ruthenocene; cyanuric chloride and derivatives thereof; and methacryloyl chloride.

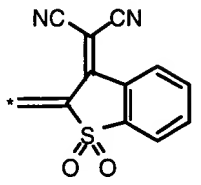
14. (Currently Amended) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



where A_a and A_b are independently selected from the group consisting of: CHO; CN; NO_2; Br, Cl; I; and



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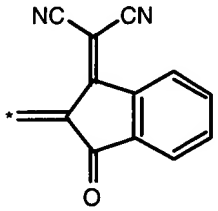

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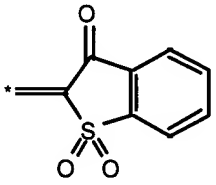

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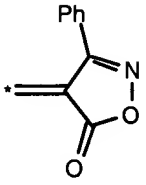

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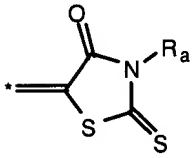

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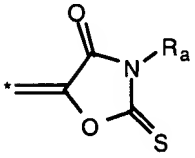

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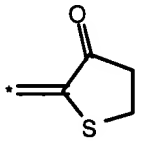

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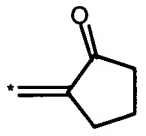

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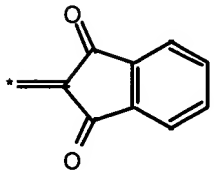

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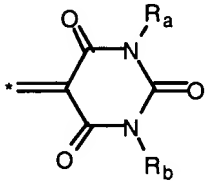

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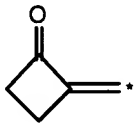

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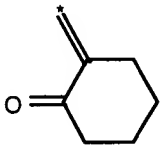

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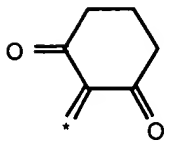

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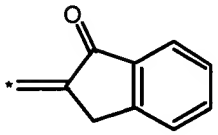

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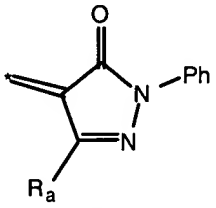

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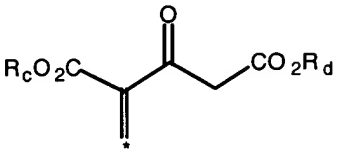

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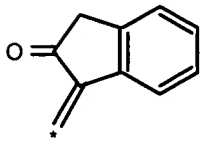

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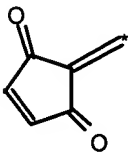

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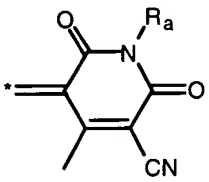

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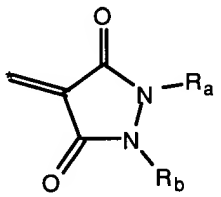

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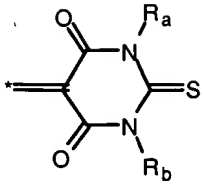

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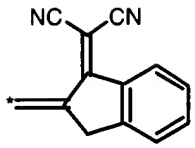

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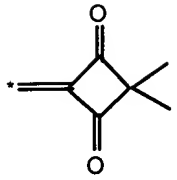

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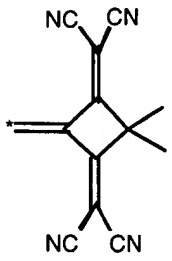

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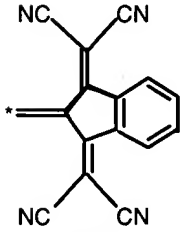

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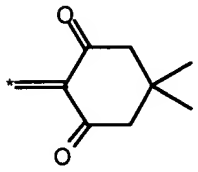

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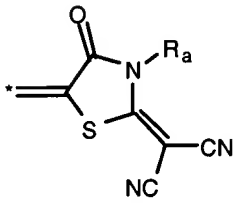

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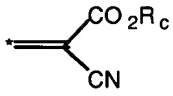

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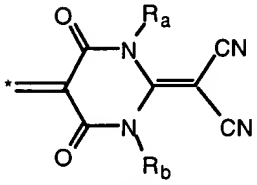

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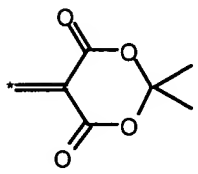

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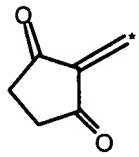

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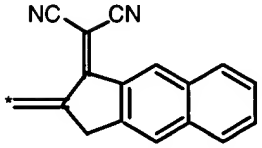

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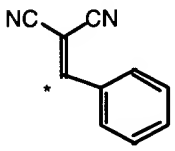

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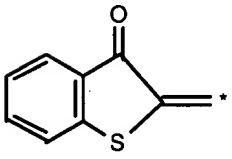

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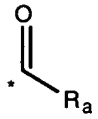

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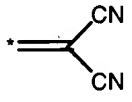

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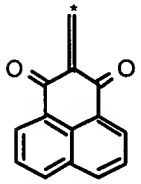

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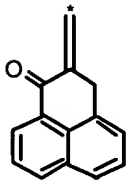

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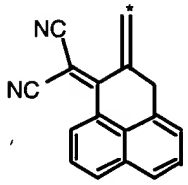

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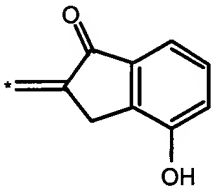

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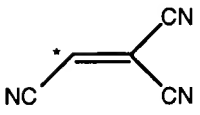

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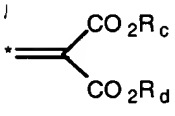

A42

~~in addition A_a and A_b are independently selected from the group consisting of: Br, Cl, and I;~~

where * indicates the point of attachment of A1-A42 to the atom to which it is to be attached;

-and where $0 \leq m \leq 10$, $0 \leq n \leq 10$, $0 \leq o \leq 10$, and $m + n + o \geq 1$; and where:

X, ~~Y,~~ and Z are independently selected from the group consisting of: $CR_k=CR_l$; O; S; and N-R_m;

R_a, R_b, R_c, R_d are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{a1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{a2}R_{a3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{a2}R_{a3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl; where $0 < \alpha < 10$ and $1 < \beta < 25$, a group of aromatic rings having up to 20 carbons in the aromatic ring framework; fused aromatic rings, vinyl; allyl; 4-styryl; acroyl; methacroyl; acrylonitrile, isocyanate; isothiocyanate; epoxides; strained ring olefins; $(-CH_2)_\delta SiCl_3$; $(-CH_2)_\delta Si(OCH_2CH_3)_3$; and $(-CH_2)_\delta Si(OCH_3)_3$; where $\delta < 25$;

R_{a1}, R_{a2}, and R_{a3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons, a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof, and methacryloyl chloride;

R_e, R_f, R_i, R_j, R_k, R_l and R_m are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{b1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{b2}R_{b3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{b2}R_{b3}$, where R_{b1}, R_{b2}, and R_{b3} are independently selected from the group consisting of a functional group derived from an amino acid; a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene, ruthenocene, cyanuric chloride and derivatives thereof and methacryloyl chloride; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, where $0 < \alpha < 10$ and $1 < \beta < 25$; a group of aromatic rings having up to 20 carbons in the aromatic framework; fused aromatic rings; CHO; CN; NO_2; Br; Cl; I; phenyl; an acceptor group containing more than two carbon atoms; a functional group derived from an amino acid and $NR_{e1}R_{e2}$; OR_{e3}; where R_{e1}, R_{e2}, R_{e3} are defined as for R_n and R_o, where R_n and R_o are defined as any member of the group

consisting of H; a linear or branched alkyl group with up to 25 carbons; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$; $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl; aryl groups; fused aromatic rings; and polymerizable functionalities; and

R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of: H; a linear or branched alkyl group with up to 25 carbons; a functional group derived from an amino acid; or a polypeptide; adenine; guanine; tyrosine; cytosine; uracil; biotin; ferrocene~~,~~; ruthenocene~~,~~; cyanuric chloride and derivatives thereof; and methacryloyl chloride.

15. (Cancelled)